APPEAL BRIEF

In RE United States Patent Application of

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Method and System for Accessing and Implementing Declarative Applications Used within Digital Multi-Media Broadcast

Examiner: Nathan E. Price

Art Unit: 2194

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The real party in interest is Sharp Laboratories of America, Inc , the assignee of record, a corporation of the state of Washington.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-7, 15, and 17-19 are canceled.

Claims 8-14, 16, and 20-29 are rejected.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection mailed June 28, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 8 claims a method of providing access to one or more services within a Digital TV Application Software Environment (DASE) using a declarative application (page 8 lines 20-24, page 4 lines 2-4). The method includes receiving a transport stream (Fig 2, 24) having content (page 9 lines 11-13) and one or more applications (page 9 lines 18-20, page 10 lines 11-16). The one or more applications provide services within the DASE (page 10 lines 13-16, 19-20). The method also includes using a renderer (Fig 2, 22) to interpret and prepare the content for rendering on a display device, such as a television screen (page 9 lines 16-18). Another element of the method is mapping at least one XDML document having at least one atomic element defined as a tag to a Document Object Model (DOM) structure having an atomic element defined as a node (page 10 lines 20-24).

The method of claim 8 finally requires using a declarative application program interface (API) (Fig 1, 10) to access Program System Information Protocol (PSIP) data (page 9 lines 5-8) (the PSIP data may include data about advanced announcements of services and data about signaling the beginning of services). The claimed declarative API (Fig 1, 10) includes an XDML API module (Fig 1, 12) (page 9 lines 3-4) introducing new tags with semantics enabling HTML pages to perform active dynamic discovery of content and/or services (page 9 lines 7-9). The claimed XDML API module (Fig 1, 12) has a rule structure for 1) defining the condition within the node of the DOM, and 2) realizing an action found in the PSIP data and defined by the at least one tag when the condition is satisfied, or 3) otherwise realizing an action defined by the node (page 11 lines 3-10).

Independent claim 14 claims a system that receives DASE-compatible broadcast streams with video, audio, and/or data components (page 9 lines 11-13, 18-20, page 10 lines 11-16), and

renders the received components to a user (page 9 lines 16-18). The claimed system includes smart cards (Fig 6, 612, 614) (page 14 lines 17-18) and a PSIP database (Fig 6, 26) containing PSIP data storing service information related to the smart cards and service information independent of the smart cards (page 14 lines 19-23).

The system of claim 14 also includes a declarative API (Fig 1, 10) configured to access the PSIP data (page 9 lines 5-8). The declarative API (Fig 1, 10) includes an XDML API module (Fig 1, 12) (page 9 lines 3-4) introducing new tags with semantics enabling HTML pages to perform active dynamic discovery of content and/or services (page 9 lines 7-9) of a transport stream (Fig 2, 24). A render[er] (Fig 2 22) is configured to intercept and prepare the content of the transport stream (Fig 2, 24) for rendering on an output device, such as a television screen (page 9 lines 16-18).

Independent claim 24 claims a method of providing access to one or more services within a DASE (page 8 lines 20-24, page 4 lines 2-4). The method includes receiving a transport stream (Fig 2, 24) having content (page 9 lines 11-13) and one or more applications (page 9 lines 18-20, page 10 lines 11-16). The one or more applications provide services within the DASE (page 10 lines 13-16, 19-20). The method also includes using a renderer (Fig 2, 22) to interpret and prepare the content for rendering on a display device, such as a television screen (page 9 lines 16-18).

The method of claim 8 also requires using a declarative API (Fig 1, 10) to access PSIP data (page 9 lines 5-8) (the PSIP data may include data about advanced announcements of services and data about signaling the beginning of services). The claimed declarative API (Fig 1, 10) includes an XDML API module (Fig 1, 12) (page 9 lines 3-4) introducing new tags with

semantics enabling HTML pages to perform active dynamic discovery of content and/or services

(page 9 lines 7-9).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 8-10, 12, 13, and 23-29 are unpatentable under 35 U.S.C. § 103 over Wugofski in view of A90 and Dolan.

Whether claim 11 is unpatentable under 35 U.S.C. § 103 over Wugofski in view of A90 and Dolan and further in view of Burkett.

Whether claims 14, 16, and 20-22 are unpatentable under 35 U.S.C. § 103 over Wugofski in view of A90, Dolan, and Eyer et al.

ARGUMENT

Applicant respectfully asks the Board of Patent Appeals and Interferences ("Board") to reverse the Examiner's rejection of all pending claims under 35 U.S.C. § 103(a). The rejections are improper as the Examiner failed to provide a *prima facie* case of obviousness because there is no motivation to combine references in the manner suggested by the Examiner, and because the proposed combination fails to teach every element of the claimed invention. In addition, the cited references teach away from the combination proposed by the Examiner. Therefore, one of skill in the art would not have found it obvious to make Applicant's invention at the time of the application when presented with the references cited by the Examiner.

In the Office Action dated June 28, 2006 ("the Office Action") the Examiner rejected Claims 8-10, 12, 13, and 23-29 under 35 U.S.C. §103(a) as unpatentable over Ted Wugofski's article, "A Modular Hypertext Markup Language for Broadcast Applications," 1 October 1998, Draft #4, Over the Moon Productions, <http://xml.coverpages.org/bhtml-4.html> (hereinafter "Wugofski") in view of the Advanced Television System Committee's standard, "ATSC Data Broadcast Standard," Doc A/90, 26 July 2000 (hereinafter "A90") and in view of Michael A. Dolan's article, "Report on Television Data Applications," NIST GCR 01-818, 1 July 2001 (hereinafter "Dolan"). The Examiner also rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Wugofski in view of A90 and Dolan and further in view of U.S. Patent No. 6,635,089 to Burkett et al. (hereinafter "Burkett"), and rejected claims 14, 16, and 20-22 under 35 U.S.C. § 103(a) as being unpatentable over Wugofski in view of A90, Dolan, and U.S. Patent No. 5,982,445 to Eyer et al. (hereinafter "Eyer").

The Examiner also rejected claim 11 under 35 U.S.C. § 112, second paragraph as being indefinite for including elements lacking antecedent basis. Applicant does not appeal this

rejection, and, if the claims are held allowable over the cited art, Applicant will submit an amendment correcting the antecedent basis problems.

Accordingly, Applicant respectfully provides the following.

Rejections under 35 U.S.C. § 103(a) over Wugofski, A90, and Dolan

The Board should reverse the Examiner's finding of obviousness as to claims 8-10, 12, 13, and 23-29 relying on Wugofski, A90, and Dolan. The standard for a Section 103 rejection is set forth in M.P.E.P. 706.02(j), which provides:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

(Emphasis added). Under this standard, it is clear that the cited references do not teach every claim limitation and that one of skill in the art at the time of the invention would not be motivated to combine the references to arrive at the claimed invention and would not expect success in doing so.

Section 103 specifically requires assessment of the invention "as a whole." The Federal Circuit explained that inventions typically are new combinations of existing principles or features. *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698 (Fed. Cir. 1983) (noting that "virtually all [inventions] are combinations of old elements"). The "as a whole" instruction in title 35 prevents evaluation of the invention part by part. *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). The Federal Circuit further explained that

> [w]ithout this important requirement, an obviousness assessment might successfully break an invention into its component parts, then find a prior art reference corresponding to each component. [*Ruiz* at 1275.] This line of reasoning would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components. Further, this improper method would discount the value of combining various existing features or principles in a new way to achieve a new result - often the essence of invention. *Id.*
>
> Contrary to this reasoning, section 103 requires assessment of the invention as a whole. *Id.* This "as a whole" assessment of the invention requires a showing that an artisan of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would have selected the various elements from the prior art and combined them in the claimed manner. *Id.* In other words, section 103 requires some suggestion or motivation, before the invention itself, to make the new combination. See *In re Rouffet*, 149 F.3d 1350, 1355-56 (Fed. Cir. 1998).

Princeton Biochemicals Inc. v. Beckman Coulter Inc., 411 F.3d 1332, 1337 (Fed. Cir. 2005).

Therefore, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify or combine what the reference teaches. "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *In re John R. Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Any such suggestion must be "found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991). Indeed, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990). A "clear and particular" showing of the suggestion to combine is required to support an obviousness rejection under Section 103. MPEP § 2142.

In addition, a prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness. MPEP § 2145; *In re Gurley*, 27

F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). In fact, it is improper to combine references where the references teach away from their combination. MPEP § 2145; *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant . . . [or] if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *In re Gurley*, 27 F.3d at 553, 31 USPQ2d at 1131.

Claims 24 and 29:

Independent claim 24 requires "using a declarative application program interface to access Program System Information Protocol (PSIP) data, wherein the declarative application program interface comprises an XDML application program interface module that introduces tags having semantics that enable performance of an active dynamic discovery of at least one of (i) the content and (ii) the services." Focusing on this limitation, it is clear that this limitation is not taught or suggested by the combination of cited references, and that one of skill in the art would not be motivated to combine the cited references in the manner suggested by the Examiner.

In the Office Action, the Examiner rejected this limitation as a whole, relying on Wugofski as teaching all elements except PSIP data and a declarative API comprising an XDML API. The Examiner then indicated that Dolan states that the ATSC is working on a standard for DASE systems and will use XDML. Finally, the Examiner indicated that A90 discloses that the PSIP standard is used to describe system information and program data. The Examiner stated that to serve the purpose of providing program guide data there must be an ability to access the

data stored in the PSIP. The problem is that the Examiner fails to show how one of skill in the art would understand from these documents "using a declarative application program interface" to perform these functions, as is required by claim 24.

This is likely due to the fact that nowhere does any one of the cited documents disclose that a declarative API is able to perform the claimed functions. The Examiner cited A90 at section 11.1 (included in the Evidence Appendix ("E.A.") herein for the convenience of the Board at E.A. 31) as disclosing that the PSIP standard is used to describe system information and program data. However, this section makes no mention that the PSIP data services are accessible to then-current declarative APIs. To read such into the one paragraph disclosure cited by the Examiner would surely be using impermissible hindsight reasoning to reconstruct Applicant's claims. Additionally, the disclosure of A90 should be read in light of the later disclosure of Dolan, which reports on the then-current state of the art (see Dolan page 30 footnote 7 (E.A. 34)).

While Dolan teaches that the new ATSC standard for declarative applications will include XDML (see Dolan page 30, (E.A. 34)), Dolan specifically teaches that the declarative application alone (the one using XDML) is unable to access electronic program guide (EPG) (E.A. 33) information, which, according to A90, is the purpose of the PSIP data (A90, page 45 (E.A. 31)). Specifically, see Dolan at page 36 (E.A. 40, "Section 9.3" and "Section 9.4"), where Dolan lists the suitability of a Declarative Only system and the suitability of a Procedural Only system. Notably, Dolan excludes electronic program guides (EPGs) from the list of suitable applications for Declarative Only systems, placing EPGs only in Procedural systems or systems having dual functionality. Similarly, Dolan's table 9.1 provides a summary of application

suitability by platform, and the declarative DASE system "DDE-1-B DASE-DA" is not listed as being EPG-suitable (E.A. 42).

Therefore, Dolan is highly probative of the state of the art as of the filing date of the application, and not only clearly shows that only procedural applications were able to access the PSIP data, but also clearly teaches away from the claimed invention of "using a declarative application program interface to access Program System Information Protocol (PSIP) data." In light of this information, it is clear that "a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d at 553, 31 USPQ2d at 1131. Therefore, Applicant respectfully submits that the cited references fail to teach "using a declarative application program interface to access Program System Information Protocol (PSIP) data," that there is no motivation contained in the references themselves to combine the references in such a way as to arrive at this limitation, and that one of skill in the art, when viewing these references would not expect success in doing so, but would instead be discouraged from doing so by the references themselves.

Furthermore, in the Office Action, the Examiner took the position that Wugofski teaches an API that introduces new tags having semantics that enable HTML pages to perform an active dynamic discovery of at least one of (i) the content and (ii) the services, citing Sections 1.1 and 4.2. However, the Examiner did not specify any specific language from Wugofski that teaches this aspect of the claim limitation of claim 24.

Section 1.1 merely discloses that Wugofski is specifying a language that might serve as the foundation for Broadcast HTML ("BHTML"). Clearly, this section does not disclose that the HTML pages perform an active dynamic discovery of content or services. Section 4.2 discusses

"the A Element," which Wugofski specifically discloses as "defin[ing] an anchor," and discloses that: "The A element's content defines the position of the anchor. The name attribute names the anchor so that it may be the destination of zero or more links. The href attribute makes this anchor the source anchor of exactly one link." Thus the A element, relied on by the Examiner, is a static element that only provides static linking by clicking on a hyperlink.

Clearly this element does not perform "active dynamic discovery" of content or services. The dynamic discovery claimed by applicant allows the declarative API to access updated information whenever a change in the content or in a condition occurs without requiring that entire pages and links be rewritten, as must occur using the static anchors described by Wugowski. Neither Dolan nor A90 discloses any information that teaches or suggests using a declarative/XDML API to perform this "active dynamic discovery," and therefore, none of the references, alone or in combination, teach this aspect of the claim limitation.

Therefore, because the cited references fail to teach every claim limitation of claim 24, because there is no motivation to combine the references in the manner disclosed so as to arrive at the claimed limitation, and because one of skill in the art would not expect success in doing so, Applicant respectfully submits that a *prima facie* case of obviousness has not been shown regarding claim 24. Claim 29 depends from claim 24 and is at least allowable for the same reasons. Applicant therefore respectfully requests that the Board reverse the rejection under 35 U.S.C. § 103(a) of claims 24 and 29.

Claims 8-10, 12, 13, 23, and 25-28:

Claims 8-10, 12, 13, 23, and 25-28 contain each of the limitations discussed above with respect to claim 24, and are at least allowable for the same reasons. In addition, each of these claims contains limitations further limiting the claimed declarative API, requiring that the API

include a rule structure for "defining a condition within [the/a] node, upon satisfaction of the condition, realizing an action defined by the at least one tag, which action is found within the PSIP data; and otherwise, realizing an action defined by the node." Applicant respectfully submits that this additional limitation is not taught or suggested by the cited references, alone or in combination.

In the Office Action, the Examiner indicated that Wugofski teaches "defining a condition within the node" (citing Appendix E.1, "public Boolean hasChildNodes()"), "upon satisfaction of the condition, realizing an action defined by the at least one tag, which action is found within the data" (citing sections 4.19 and 6.2), and "otherwise, realizing an action defined by the node" (citing sections 4.19 and 6.2). However, the rejection by the Examiner fails to note that the action to be taken is an action "found within the PSIP data" (see claims 8 and 25).

Section 4.19 of Wugofski describes a Switch element that allows rendering of alternate presentations based on the results of certain test elements. Nothing in this section discloses that the action taken will be found within PSIP data. Section 6.2 describes an Event element that triggers an action based on the occurrence of a designated event, such as the end of a media stream. Again, nothing in this section describes that the action taken is found within PSIP data. Therefore, nothing in Wugofski teaches the claimed limitation of realizing an action found within PSIP data, as is required by the claim. As is set forth above in detail, this is not surprising given the fact that none of the cited references disclose access to PSIP data using a declarative application, as the claims require.

In the Office Action, the Examiner made a passing reference to PSIP in Wugofski, asserting that Wugofski recognizes that PSIP can be used with the disclosed technology of Wugofski, citing Appendix G.3's "oneventstart." However, this disclosure does not disclose the

claimed limitation of "an action found within PSIP data," but rather discloses only detecting the beginning or end of a PSIP event (or a media stream) and taking an independent action (the action being contained in the statically-written bHTML, and not "found within the PSIP data") based on the happening of the beginning or end of the PSIP event.

Finally, the Examiner's rejection of the claim limitations draws from various sections of Wugofski without setting forth how Wugofski teaches a rule structure for each of the elements. Specifically, Wugofski draws on Appendix E.1 as disclosing nodes, then makes an unsupported assumption that the mere disclosure of the presence of nodes in Wugofski somehow discloses "a rule structure for: defining a condition within a node," when nothing of Wugofski explains a connection between Sections 4.19 and 6.2 to Appendix E.1. The only mention of nodes in Wugofski is in the Appendices, and the Appendices do not disclose "defining a condition within a node." Therefore, Applicant respectfully submits that Wugofski fails to teach or suggest the claimed rule structure in all its details.

Dolan and A90 also fail to teach or suggest these limitations, as neither document discusses rule structures, nodes, or declarative API access to actions found within PSIP data. Because none of the cited references, alone or in combination, teach every claim limitation, Applicant respectfully submits that the claims containing these limitations are not made obvious by the cited combination of references. Therefore, for the reasons discussed above with respect to claim 24, and for the additional reasons discussed in this section, Applicant respectfully submits that claims are not made obvious by the cited references. Applicant respectfully requests that the Board reverse the Examiner as to the rejections of claims 8-10, 12, 13, 23, and 25-28 under 35 U.S.C. § 103(a).

Rejection of claim 11 under 35 U.S.C. § 103(a) over Wugofski, A90, Dolan, and Burkett

The Board should reverse the Examiner as to the rejection of claim 11 under 35 U.S.C. § 103(a). The standard for a rejection under 35 U.S.C. § 103(a) is discussed above in detail with respect to the rejections over Wugofski, A90, and Dolan alone. The Examiner should be reversed as the additional reference cited by the Examiner, Burkett, fails to disclose the limitations discussed above with reference to claim 8. Claim 11 adds additional limitations to those discussed above with reference to claim 8. In the Office Action, the Examiner relied on Burkett only to teach the additional limitations claimed by claim 11, and did not indicate that Burkett teaches anything regarding the claim limitations discussed above with respect to claim 8. Therefore, claim 11 is not made obvious by the addition of Burkett as Burkett fails to address PSIP data in any form, and does not even deal with DASE systems. Applicant therefore respectfully requests that the Board reverse the rejection of claim 11 by the Examiner under 35 U.S.C. § 103(a).

Rejections of claims 14, 16, and 20-22 under 35 U.S.C. § 103(a) over Wugofski, A90, Dolan, and Eyer

The Board should reverse the rejections of claims 14, 16, and 20-22 under 35 U.S.C. § 103(a) relying on Wugofski, A90, Dolan, and Eyer. The standard for a rejection under 35 U.S.C. § 103(a) is discussed above in detail with respect to the rejections under Wugofski, A90, and Dolan alone. The Examiner should be reversed because the cited references, alone or in combination, fail to teach or suggest every claim limitation, because there is no motivation to combine the references in the manner suggested by the Examiner, and because one of skill in the art would not expect success in arriving at the claimed invention by combining the references in the manner suggested. Additionally, the cited references teach away from the claimed invention.

Independent claim 14 requires "a declarative application program interface configured to access the PSIP data, wherein the declarative application program interface comprises an XDML application program interface module that introduces new tags having semantics that enable HTML pages to perform an active dynamic discovery of at least one of (i) content and (ii) services of a transport stream." As discussed in detail above in relation to the rejection of claim 24, this limitation is not taught or suggested by the combination of references including Wugofski, A90, and Dolan. Additionally, as discussed above, there is no motivation to combine these references in the manner suggested by the Examiner to arrive at the claimed limitation, and the cited references, specifically the newest reference, Dolan, specifically teaches against the claimed limitation. Therefore, Applicant respectfully suggests that this limitation is not made obvious by the combination of Wugofski, A90, and Dolan.

Applicant further respectfully submits that the addition of Eyer does not make obvious the claimed limitation. In the Office Action, the Examiner relied on Eyer as disclosing smart cards and a smart card memory including a channel map. The Examiner did not rely on Eyer as disclosing a declarative API accessing PSIP data or an XDML API, as Eyer does not discuss PSIP data or XDML, let alone a declarative API comprising an XDML API accessing the unmentioned PSIP data. Therefore, the addition of Eyer does not provide any information that would make the claimed limitation obvious in light of the enlarged combination of Wugofski, A90, Dolan, and Eyer. Applicants therefore respectfully submit that a *prima facie* case of obviousness has not been shown regarding claim 14. Claims 16 and 20-22 depend from claim 14 and are at least allowable for the same reasons.

Applicants therefore respectfully request that the Board reverse the Examiner as to the rejections of claims 14, 16, and 20-22 under 35 U.S.C. § 103(a).

Conclusion

The Board should reverse each of the Examiner's rejections under 35 U.S.C. § 103(a) in light of the evidence and arguments. None of the rejections made by the Examiner provide a *prima facie* case of obviousness, because the combination of the cited references fails to disclose every element of the claims, because there is no motivation to combine the references in the manner disclosed by the Examiner, because the references themselves teach against the suggested combination, and because one of skill in the art would not expect success in combining the references in the manner disclosed by the Examiner. The conclusion that must be drawn from the rejections by the Examiner is that the Examiner has relied on improper hindsight reasoning to reconstruct Applicant's claims against the requirements of Section 103. The Board should therefore reverse the Examiner as to all rejections under 35 U.S.C. § 103(a).

Dated this 13 day of November, 2006.

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CLAIMS APPENDIX

1-7. (cancelled)

8. (previously presented) A method of providing access to one or more services within a Digital TV Application Software Environment (DASE), the method comprising:

receiving a transport stream having content and one or more applications, wherein the one or more applications provide the one or more services within the Digital TV Application Software Environment (DASE);

using a renderer to interpret and prepare the content for rendering on a display device;

mapping at least one XDML document to a Document Object Model (DOM) structure, the XDML document having at least one atomic element defined as a "tag" and the DOM having an atomic element defined as a "node;" and

using a declarative application program interface to access Program System Information Protocol (PSIP) data, wherein the declarative application program interface comprises an XDML application program interface module that introduces new tags having semantics that enable HTML pages to perform an active dynamic discovery of at least one of (i) the content and (ii) the services, wherein the XDML application program interface module includes a rule structure for:

defining a condition within the node;

upon satisfaction of the condition, realizing an action defined by the at least one tag, which action is found within the PSIP data; and

otherwise, realizing an action defined by the node.

9. (original) The method according to claim 8 further comprising the step of rendering the XDML document based on the realized action.

10. (previously presented) The method according to claim 8 wherein the mapping step comprises identifying all tables via a master guide table.

11. (previously presented) The method according to claim 10 further comprising the steps of:

defining an object class for each table identified;

parsing each table;

for each parsed table, constructing an object instance;

generating a DOM root document object;

adding each virtual channel as a child of the DOM root document object; and

adding each event information table as a child of a virtual channel table based on source ID.

12. (previously presented) The method according to claim 8 further comprising the step of rendering the realized action for display on the display device.

13. (original) The method according to claim 8 further comprising the step of automatically and dynamically updating all referenced actions.

14. (previously presented) A system that receives DASE-compatible broadcast streams containing video, audio, or data components, or any combination thereof, and renders the component(s) in a manner useful to an end user, the system comprising:

a plurality of smart cards;

PSIP data preserved within a PSIP database, in which service information pertaining to the plurality of smart cards is stored as well as further service information provided by the system independent of the services of the plurality of the smart cards; and

a declarative application program interface configured to access the PSIP data, wherein the declarative application program interface comprises an XDML application program interface module that introduces new tags having semantics that enable HTML pages to perform an active dynamic discovery of at least one of (i) content and (ii) services of a transport stream, wherein a render is configured to interpret and prepare the content of the transport stream for rendering on an output device.

15. (cancelled)

16 (previously presented) The system according to claim 14 wherein the system further includes means for mapping XDML declarative applications to a Document Object Model (DOM), which is used to enable JavaScript access to the PSIP database.

17-19. (cancelled)

20. (previously presented) The system according to claim 14 wherein the new tags include associated unique identification values to access content.

21. (previously presented) The system according to claim 14 wherein the content can be generated based on user-inputs.

22. (previously presented) The system according to claim 14, wherein the services comprise at least one of:

(i) an electronic program guide;

(ii) a weather reports;

(iii) a stock market report;

(iv) television commerce;

(v) a game;

(vi) interactive advertising;

(vii) interactive news

(viii) an interactive TV show;

(ix) an interactive sports broadcast;

(x) TV-gaming,

(xi) TV-auctioning;

(xii) email; and

(xiii) web-browsing.

23. (previously presented) The method according to claim 8, wherein the services comprise at least one of:

(i) an electronic program guide;

(ii) a weather reports;

(iii) a stock market report;

(iv) television commerce,

(v) a game;

(vi) interactive advertising;

(vii) interactive news

(viii) an interactive TV show;

(ix) an interactive sports broadcast;

(x) TV-gaming;

(xi) TV-auctioning;

(xii) email; and

(xiii) web-browsing.

24. (previously presented) A method of providing access to one or more services within a Digital TV Application Software Environment (DASE), the method comprising:

receiving a transport stream having content and one or more applications, wherein the one or more applications provide the one or more services within the Digital TV Application Software Environment (DASE);

using a renderer to interpret and prepare the content for rendering on a display device; and

using a declarative application program interface to access Program System Information Protocol (PSIP) data, wherein the declarative application program interface comprises an XDML application program interface module that introduces tags having semantics that enable performance of an active dynamic discovery of at least one of (i) the content and (ii) the services.

25. (previously presented) A method as recited in claim 24, wherein the XDML application program interface module includes a rule structure for:

defining a condition within a node;

upon satisfaction of the condition, realizing an action defined by a tag, wherein the action is found within the PSIP data; and

otherwise, realizing an action defined by the node.

26. (previously presented) The method as recited in claim 25, further comprising the step of rendering the XDML document based on the realized action.

27. (previously presented) The method as recited in claim 25, further comprising the step of rendering the realized action for display on the display device.

28. (previously presented) The method as recited in claim 25, further comprising the step of automatically and dynamically updating all referenced actions.

29. (previously presented) The method as recited in claim 24, wherein the services comprise at least one of:

(i) an electronic program guide;

(ii) a weather reports;

(iii) a stock market report;

(iv) television commerce;

(v) a game;

(vi) interactive advertising;

(vii) interactive news

(viii) an interactive TV show;

(ix) an interactive sports broadcast;

(x) TV-gaming,

(xi) TV-auctioning;

(xii) email; and

(xiii) web-browsing.

EVIDENCE APPENDIX

Excerpt from ATSC Data Broadcast Standard A/90

11. DATA SERVICE ANNOUNCEMENT REQUIREMENTS

11.1 Introduction

Program and System Information Protocol (PSIP), specified in [2] is a collection of hierarchically arranged tables for describing system information and program guide data. This standard utilizes and builds upon the PSIP Standard to select data services in the broadcast stream. This standard defines extensions to [2].

The schedule of a Data Service may not be announced as a separate event; however there shall be a data_service_descriptor associated with each Data Service.

11.2 Virtual Channels

Each virtual channel in a PSIP Virtual Channel Table (VCT)[7] shall include no more than one data service. Consequently, there shall be no more than one data elementary stream of stream_type value 0x95 (Service Description Framework information) listed in each virtual channel's Service Location Descriptor in the VCT. Furthermore, there shall be no more than one data elementary stream of stream_type value 0x95 (Service Description Framework information) listed in a TS_program_map_section (instance of a Program Map Table) as defined in [11].

The Service Location Descriptor of a virtual channel conveying a data service shall list all the data elementary streams belonging to the ISO/IEC 13818-1 Program associated with the Virtual Channel that may be used by the data service. The data service may utilize any or all of the protocol encapsulation types defined by this standard. The minor_channel_number (as defined in [2]) for services of service_type value 0x04 shall be equal to or greater than 100. Even with this constraint, up to 900 stand-alone data services per value of major virtual channel number can be present in the ATSC Transport Stream.

11.3 Data Event Table

A new table, named the Data Event Table (DET) is defined hereinafter. The purpose of the DET is twofold:

- To support the announcement of a data service in a Virtual Channel (PSIP service_type field value equal to 0x04) which does not include any audio-visual event.
- To allow separate announcement of the data service portion of an audio/video/data event (PSIP service_type field value equal to 0x02) or audio/data event (PSIP service_type field value equal to 0x03) in a Virtual Channel.

For a virtual channel of service_type 0x04, every data service event shall be announced in a DET.

For a virtual channel of service_type 0x02 or 0x03, the data service portion of an audio/video/data event may be announced independently in a DET. The purpose of such separate

[7] The VCT is a more general term that includes either the TCVT or the CVCT as defined in reference [2].

Excerpts from Dolan's Report on Television Data Applications

Coupons
Electronic Program Guide (EPG)
EPG Interaction
Gambling
Gaming
Home Shopping
Inquiry
Look and Feel
Mark for Recording
Polling
Sports Statistics
Train/Plane Schedules
Targeted Advertising
Viewer Demographics
Weather

7.2.1 Coupons

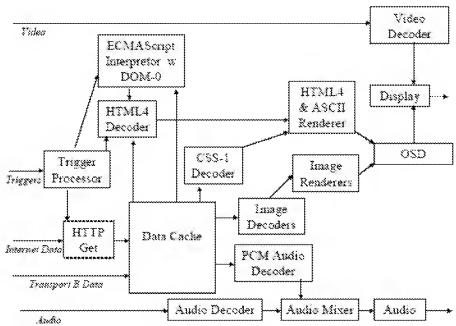
This is the offer for a discount or other incentive to the viewer for a product or service. This could range from the discounted pay per view movies from the broadcaster or aggregator itself, or for items currently being advertised. This is different from "inquiry" below in that it could be done without any interaction by the viewer. This has the interesting receiver requirement that there be some sort of output device to either print the coupon or otherwise transfer its value to the viewer.

7.2.2 Electronic Program Guide (EPG)

This is the display on the receiver of the services and programming that is coming up. This data is carried either in the television signal or out of band, and does not require any sort of return channel (see more below on enhanced variations on this). Also, the interaction is local to the receiver – that is, it is used primarily for tuning or recording or other things the viewer does locally to the receiver.

7.2.3 EPG Interaction

This is a richer EPG experience that involves retrieving program reviews and other activities that require a return channel. Other examples include: purchasing pay per view movies, purchasing DVD's, purchasing audio CD's, obtaining more information about the movie or audio program such as artists, directors, etc.



8.3 SMPTE DDE-1 (Transport B) & ATSC DASE-1 (Declarative Only[6])

The "Transport B" version of DDE-1 delivers the data over the video/audio broadcast along with the triggers. The Internet return-channel in this architecture is optional, since all the data essence could be delivered in the video/audio broadcast. The triggers are more likely to use the lid: URI scheme, but can use both lid: and http:.

ATSC is very close to completing the standardization[7] of its DTV Application Software Environment (DASE). It includes two main application environments: Declarative and Procedural. For this architecture we will constrain it to only a declarative application (DA) only. Due to the primary functional requirement of the DASE-DA, it is functionally very similar to SMPTE DDE-1, the only exception being no return-channel is defined.

ATSC-DA is comprised of the following Web technology:

XDML (XHTML1.0 Traditional and Frameset subsets)
CSS2 Subset
ECMAScript
DOM2 Subset

[6] This is not meant to characterize a possible DASE receiver as "declarative only", but rather define it through an authoring constraint.
[7] This document is based on the ATSC work in process as of this writing. The reader is cautioned that the final DASE-1 Standard may differ from this and final publication from ATSC should be consulted.

Additionally, it includes decoders for the following content types, which may be embedded in the XHTML:

PNG Images (image/png)
JPEG Images (image/jpeg)
PCM Audio (audio/basic)
MNG Animated Graphics (video/mng)
Portable Font Resource (TrueDoc®) Fonts (application/font-tdpfr)
Zip Archive (application/zip)

URI scheme support includes:

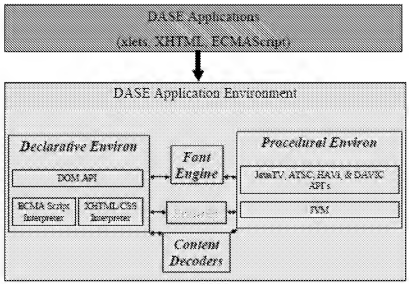
tv:
lrd:

And, finally, it includes support for a "trigger". A trigger is a special data type that provides synchronization between the DASE-DA content and the video/audio programming. The synchronization is currently loose since the system assumes zero decode time for both the trigger and the target content. The trigger is an event as defined at W3C. This is a richer, more generalized version of the DDE-1 trigger.

The main functional additions in DASE-DA are the support for MNG video files and downloadable fonts.

There is no full time Internet connection or return channel. For more information, please see [DASE]. A block diagram of a typical ATSC DASE receiver is shown in Figure 8.2 below. Note that the DA portion is all we are focused on in this section (ignore the PA environment).

Figure 8.2 Typical ATSC DASE-1 Receiver.



8.4 DVB MHP 1.0 & ATSC DASE-1 (Procedural Only)

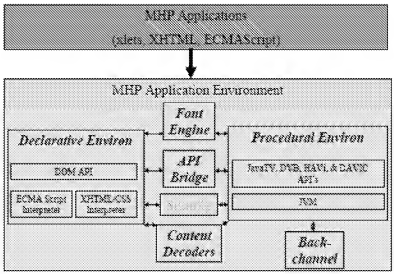
Both DVB MHP 1.0 and ATSC DASE-1 define a procedural environment based on the Java Virtual Machine and a set of special API's. The two environments are very similar in that the API support is based around:

Personal Java
Java Media Framework (JMF)
Java® TV
HAVi

In addition, they also each contain some private API's (org.atsc.* and org.dvb.*) for support of the differences between the transports as well as functions not standardized in Java TV. So, while it may be possible to author content that works on both environments, it is likely that the behavior will vary or environment-dependent classes needed/used.

See Figure 8.2 for a general picture of the architecture of the entire DASE environment. Note that we are focused only on the PA environment in this section. See Figure 8.3 below for a picture of a typical MHP 1.1 receiver. For the procedural only environment, ignore the left half of the diagram.

Figure 8.3 Typical DVP MHP 1.1 Receiver.



8.5 ATSC DASE-1 & MHP 1.1 (Procedural and Declarative)

Finally, by combining the Declarative and Procedural environments, one has the union of the architectures described above. See Figure 8.2 for the entire DASE-1 environment, and see Figure 8.3 for the entire MHP 1.1 environment, both of which have a similar architecture and design. The major function difference is that DVB MHP 1.1 contains a return-channel.

8.6 OCAP

A standard for the US cable industry is underway[8] in the OpenCable group managed by Cablelabs, called OCAP. It is an environment that is basically the union of SMPTE DDE-1 Transport B and DVB MHP 1.0.

8.7 Summary of Platform Capabilities

Table 8.1 shows a summary comparison of the platform capabilities important to authoring.

Table 8.1 Summary of Platform Capabilities.

Capability	None	DDE-1-A	DDE-1-B DASE-	DASE-PA	MHP 1.0	MHP 1.1	OCAP

[8] This information about OCAP is based on the presentation made by Cablelabs at the NIST Symposium held on 21-June-01.

Report on Television Data Applications

			DA				
Markup Languages	X	X	X			X	X
ECMAScript	X	X	X			X	X
DOM	X	X	X	X		X	X
Image Content	X	X	X	X	X	X	X
PCM Audio	X	X	X	X	X	X	X
Java Virtual Machine	X			X	X	X	X
Java TV API's				X	X	X	X
HAVi API's				X	X	X	X
JMF API's				X	X	X	X
Return channel		X			X	X	X

9 Suitability of Each Receiver Configuration to the Application Requirements

9.1 None (separate Internet browser)

While the least defined, this is the most powerful of the environments. It relies on household computer capability which has grown to be quite rich. And, often a Windows® and Pentium® platform is assumed where the content authors actually include executables and plugins for this specific platform. This leads to a very open ended capability set, and thus, all applications **could** execute on this platform. However, it forces a physical dual-screen environment, and it is not possible to have reliably synchronized applications. The applications that seem workable in some reasonable manner are:

Teletext
Gambling
Gaming
Polling
Train/Plain Schedules
Weather

9.2 SMPTE DDE-1 (Transport A)

Transport A version of DDE-1 requires a return channel to work. Hence it has a few extra things it can do that Transport B cannot reliably do. It is declarative only, so applications that require general purpose computing cannot be done. Unlike "none", it uses a single screen so advertising and other applications requiring coupling to video can be accomplished. The applications that seem workable in some reasonable manner are:

Teletext
Coupons
Gambling
Gaming
Home Shopping
Inquiry
Polling
Plane/Train Schedules
Weather

9.3 SMPTE DDE-1 (Transport B) & ATSC DASE 1.0 (Declarative Only)

Transport B DDE-1 removes the requirement for a return channel. Thus it has a reduced application set with respect to Transport A. Since DASE DA is functionally very similar (the extra functions do not increase application support), then the list is identical. The applications that seem workable in some reasonable manner are:

Teletext
Coupons
Look and Feel
Train/Plane Schedules
Weather

9.4 DVB MHP 1.0 & ATSC DASE-1 (Procedural Only)

ATSC DASE PA provides a robust general-purpose computing environment, but it lacks a return channel. Hence many applications that it could otherwise do are not possible. But, the applications that seem workable in some reasonable manner on ATSC DASE 1.0 PA are:

Coupons
EPG
Look and Feel
Train/Plane Schedules
Weather

In contrast, the MHP 1.0 environment can do **all applications** except for "Mark for Recording". The PVR functions like this are relatively new, else it would probably have that as well. The primary reasons for this environment being able to handle the applications are:

Return channel
General Purpose Computing

9.5 ATSC DASE-1 (Procedural and Declarative)

This is just the union of the DA and PA capabilities, and thus the supported applications. The union list is:

Teletext
Coupons
EPG
Look and Feel
Train/Plane Schedules
Weather

9.6 DVB MHP 1.1 (Procedural and Declarative)

This is MHP 1.0 (including the return channel) and a DA environment similar to DASE-1, hence is supports all the application scenarios.

9.7 OCAP (Procedural and Declarative)

This is DDE-1-B, plus MHP 1.0. Since DDE-1-B is functionally almost equivalent to DASE-1 PA and MHP 1.1 DA, it is therefore functionally equivalent to MHP 1.1, and thus supports all application scenarios.

9.8 Summary of Application Analysis

Table 9.1 below shows a summary of all the applications discussed in this report and which are likely to work or are best suited to each environment. As a general rule, **anything** can be done in a procedural environment with a return-channel. So, you will find the MHP columns and the OCAP column to be complete. However, the question of authoring cost affects this utility. For example, what may be a suitable authoring cost using HTML may be excessive using Java. Thus, the fact that one **could** do anything in Java TV is only one factor in considering what is best. This weighs in favor of the DA only environment (DDE).

The second driving factor (not addressed in this "authoring" report) is receiver cost. Clearly, it is more expensive to implement both the DA and PA environments than only one environment. So, without making any claims as to which environment may be more costly to implement in a receiver, clearly authoring both is more expensive than authoring one. So, this weighs in favor of the DA or PA only environments (DDE, DASE PA, MHP 1.0).

It is the author's opinion that in the near term, authoring complexity (i.e. production cost – see Section 7.4.5), and receiver cost will both be large factors in adoption of specific ITV environments.

The other thing of note is that the "Mark for Record" applications are not directly supported in any environment (although MHP comes close, there is currently no content identification to make it actually usable). This is one of a class of applications grouped into "personal video recorders" or PVR's, and are being addressed at this writing by the TV Anytime group [TVA]. While this is primarily a receiver functional set, it is an important emerging capability that will, in the near term, overshadow the advanced environments discussed here, in the author's opinion. The reader is encouraged to follow this work closely, particularly as it works through the content rights management issues.

Table 9.1 Summary of Application Suitability to Platforms.

Application	None	DDE-1-A	DDE-1-B DASE-DA	DASE-PA	MHP 1.0	MHP 1.1	OCAP
Closed Captioning				X	X	X	X
Nielsen Ratings					X	X	X
Teletext	X	X	X	X	X	X	X
Coupons		X	X	X	X	X	X
EPG				X	X	X	X
EPG Interaction		X			X	X	X
Gambling	X	X			X	X	X
Gaming	X	X			X	X	X
Home Shopping		X			X	X	X
Inquiry		X			X	X	X
Look and Feel			X	X	X	X	X
Mark for Recording							
Polling	X	X			X	X	X
Sports Statistics	X	X	X	X	X	X	X
Train/Plane Schedules	X	X	X	X	X	X	X
Targeted Advertising	X			X	X	X	X
Viewer Demographics					X	X	X
Weather	X	X	X	X	X	X	X

RELATED PROCEEDINGS APPENDIX

None.